

Pedro V. Guillaumon

POST-DOC RESEARCHER

Laboratori Nazionali del Gran Sasso - INFN
Via Giovanni Acitelli 22, 67100 Assergi (AQ) Italy

Brazilian, 20/03/1990

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Education

University of Sao Paulo

PHD, NUCLEAR ASTROPHYSICS

2015-06/12/2019

- Study of $^{nat}Pb(p, xn)^{201-207}Bi$ reactions and possible implications for the r-process
- Advisor: Prof. Dr. Iuda D. Goldman
- Measurement of charge reaction cross sections that could be important during the r-process. I also did theory and simulations of the r-process.

University of Sao Paulo

MSC, NUCLEAR PHYSICS

2012-2015

- Search of Oligoelements in Volcanic Stones
- Advisor: Prof. Dr. Iuda D. Goldman
- Measurement of trace elements using thermal neutron activation analysis. These measurements have implications for geoneutrinos, to understand the origin of Hawaii archipelago and to understand the extinction of the dinosaurs.

University of Sao Paulo

BSc, PHYSICS

2008-2012

Professional Experience

10.10.2021- **Post-Doc Researcher**, Laboratori Nazionali del Gran Sasso

Development of hardware and data analysis for CUORE/CUPID/CRESST. For CUORE I am developing a new data analysis based on machine learning to remove noise at low energies. This will allow us to calculate the EC decay of ^{123}Te and limits on solar axions and dark matter. I am also optimizing some modules used in the Onbb analysis. For CUPID I am participating on Hall A and Hall C activities (BDPT and CCVR measurements) and I am developing an optimizing a NTD-Ge feedback system that can in principle reach the same rise and decay times and resolution as TES. For CRESST I am creating a new method of calibration for energies below 1 keV that can allow us to send X-rays from outside the cryostat. I am the P.I. of the LUCE experiment, validating LUAG calorimeters to measure ^{176}Lu EC decay and as dark matter and neutrino detectors. *Supervisor: Dr. Carlo Bucci*

2020-2021 **Post-Doc Researcher**, Institute of Physics, University of Sao Paulo

Study of conditions and constraints for the nucleosynthesis of r/rp-elements in supernovae and neutron mergers. Basically the purpose of this work was to measure some cross sections and to study the nuclear structure of some isotopes that can occur in supernovae and neutron mergers. *Supervisor: Prof. Dr. Edilson Crema*

2012-2019 **Graduate Teaching Assistant**, Institute of Physics, University of Sao Paulo

Physics I, Statistical Methods for Physicists, Physics for Pharmaceutical and Biological Sciences, Experimental Physics III for Engineers

2013-2014 **Visiting Student Researcher**, University of California at Berkeley

Measurement of trace elements using thermal neutron activation analysis and of fast neutron activation analysis for homeland security. *Advisor: Prof. Dr. Eric B. Norman*

2012 **Visiting Student Researcher**, University of California at Berkeley

Measurement of trace elements using thermal neutron activation analysis. These measurements have implications for geoneutrinos, to understand the origin of Hawaii archipelago and to understand the extinction of the dinosaurs. *Advisor: Prof. Dr. Eric B. Norman*

Awards, Fellowships, & Grants

- 2021- **Winner of the INFN Post-Doctoral Research Fellowship Competition for Non-Italians**, Istituto Nazionale di Fisica Nucleare
- 2015-2019 **Graduate Research Fellowship**, CAPES - Coordination of Superior Level Staff Improvement, Brazil
- 2013 **Winner of the Graduate Research Fellowship Competition to do Research Abroad**, American Physics Society - Brazilian Physics Society
- 2013 **Winner of the Graduate Research Fellowship Competition to do Research Abroad**, Experimental Physics Department / University of Sao Paulo
- 2012-2015 **Graduate Research Fellowship**, CAPES - Coordination of Superior Level Staff Improvement, Brazil
- 2012 **Winner of the Graduate Research Fellowship Competition to do Research Abroad**, Experimental Physics Department / University of Sao Paulo

Presentations

INVITED TALKS - INTERNATIONAL

- Autumn 2022. *The CUORE experiment*. Invited talk. Applications of Superconducting Electronics and Detectors Workshop, JeffersonLab, USA.
- Autumn 2022. *Recent progress on BSM and dark matter searches in CUORE*. Invited talk. International conference PUMA22 Probing the Universe with Multimessenger Astrophysics, Italy.
- Winter 2021. *From Nuclear Physics to Astrophysics. A few experiments*. Invited talk. Quark Matter Research Center, Institute of Modern Physics, China.

INVITED TALKS - NATIONAL

- Winter 2023. *Methods on data analysis for signal processing and noise reduction, nucleosynthesis simulations, and neutron flux monitoring*. Invited talk. Università Degli Studi Di Napoli Federico II Dipartimento Di Fisica "Ettore Pancini", Naples, Italy.
- Winter 2023. *The CRESST experiment*. Invited talk. GSSI Science Fair, L'Aquila, Italy.
- Spring 2014. *From Earth's Origin to the Extinction of Dinosaurs: What we can learn from volcanic rocks analysis*. Invited talk. Federal Institute at Caraguatatuba, Math. Depart., Brazil.

INVITED TALKS - COLLABORATION MEETINGS

- Spring 2023. *Updates on the CRACK project: detector calibration with low-energy X-rays*. Invited talk. CRESST Collaboration Meeting, Bratislava, Slovakia.
- Spring 2023. *Low Energy Studies: mock data, validation and ^{123}Te* . Invited talk. CUORE Collaboration Meeting, South Carolina, USA.
- Autumn 2022. *A deep-learning method for the clean up of low-energy junk and the analysis of ^{123}Te EC Decay*. Invited talk. CUORE Collaboration Meeting, Italy.
- Autumn 2022. *CRACK project. A calibration system for energies below 1 keV*. Invited talk. CRESST Collaboration Meeting, Italy.
- Spring 2022. *The CRACK project*. Invited talk. CRESST Collaboration Meeting, German.
- Spring 2022. *Low Energy Analysis: EC Decay of ^{123}Te and the mysterious 4.7 keV peak*. Invited talk. CUORE Collaboration Meeting, Italy.
- Spring 2022. *Energy Selector Module*. Invited talk. CUORE Collaboration Meeting, Italy.

CONTRIBUTED PRESENTATIONS

- Barcellos de Oliveira, H., **Guillaumon, P.V.**, Costa, O.L., Vanin, V.R., Goldman, I.D. 2019. Study of $^{nat}\text{Pb}(p, xn)^y\text{Bi}$ reactions at IPEN/CNEN-SP Cyclone-18 and Cyclone-30 Cyclotrons. Poster: 2019 International Nuclear Atlantic Conference.

Guillaumon, P.V., Goldman, I.D., Pascholati, P.R., Norman, E.B., Thomas, K.J., Meyer, R.E., Sabella, J.L., Smith, A.R., Madi-Filho, T., 2016. Measurements of Trace Element Abundances in Lava via Neutron Activation Analysis. Poster: 2016 INPC Meeting, Adelaide, Australia.

Guillaumon, P.V., Norman, E.B., Thomas, K.J., Pascholati, P.R., Madi-Filho, T., Goldman, I.D. 2014. Measurements of Trace Elements in Volcanic Lavas. Poster: 4th International Nuclear Chemistry Congress.

Norman, E.B., Thomas, K.J., **Guillaumon, P.V.**, Pascholati, P.R., Goldman, I.D., Tabacniks, M.H., Madi-Filho, T. 2013. Search of Oligoelements in Volcanic Stones. 2013 RTFNB.

Norman, E.B., Goldman, I.D., Pascholati, P.R., Tabacniks, M.H., **Guillaumon, P.V.**, Thomas, K.J. 2012. Search of Oligoelements in Volcanic Stones. 2012 RTFNB.

Norman, E.B., Goldman, I.D., Pascholati, P.R., Tabacniks, M.H., **Guillaumon, P.V.**, Thomas, K.J. 2012. Optimized PIXE for sub-ppm Analysis of Th in Volcanic Rocks. 2012 RTFNB.

Conferences & Schools

RECENT PARTICIPATIONS

- 2023 **CRESST Collaboration Meeting, Spring**, Bratislava, Slovakia
- 2023 **CUORE Collaboration Meeting, Winter**, South Carolina, USA *Virtual*
- 2023 **CUPID Collaboration Meeting, Winter**, Boston, USA *Virtual*
- 2022 **CUORE Collaboration Meeting, Winter**, Santo Stefano di Sessanio, Italy
- 2022 **CRESST Collaboration Meeting, Winter**, Santo Stefano di Sessanio, Italy
- 2022 **International conference PUMA22 Probing the Universe with Multimessenger Astrophysics**, Sestri Levante, Italy
- 2022 **INFN SOUP 2022 - The 2nd INFN School on Underground Physics: Theory and Experiments**, Laboratori Nazionali del Gran Sasso, Italy
- 2022 **NEUTRINO 2022**, Virtual *Virtual*
- 2022 **EXCESS Workshop 2022**, Vienna, Austria *Virtual*
- 2022 **CUPID Collaboration Meeting, Spring**, LNGS and La Sapienza, Assergi and Rome, Italy
- 2022 **CUORE Collaboration Meeting, Spring**, La Sapienza, Rome, Italy
- 2022 **CRESST Collaboration Meeting, Spring**, Tübingen, German

Other Relevant Information

LUCE Collaboration (LUTetium sCintillator Experiment)

SPOKESPERSON AND PROPOSER OF THE EXPERIMENT: PEDRO V. GUILLAUMON

2023-

Research Interests

Nuclear and Particle AstroPhysics

DARK MATTER

Neutrino Physics

Nuclear Structure

Nuclear Reactions

Stellar Nucleosynthesis

Cryogenic Detectors

Gamma Spectroscopy

Others

DATA ANALYSIS

Machine Learning

Outreach

CUPID Collaboration

MEMBER OF THE OUTREACH BOARD OF CUPID

I am the administrator of the CUPID website, responsible to update and maintain it. I am also responsible to post new jobs offers and news on the website.

Languages

Portuguese

NATIVE

English

FLUENT

French

BASIC FLUENCY

Italian

INTERMEDIATE

Programming Skills

C++, Python, Julia, Wolfram Mathematica

Publications

PUBLISHED/IN REVIEW

Kinast, A., Angloher, G., Banik, S., ..., **Guillaumon, P.V.** et al. 2023. Characterisation of low background CaWO crystals for CRESST-III. SciPost Physics Proceedings 12 (031). doi:10.21468/SciPostPhysProc.12.031.

Angloher, G., Banik, S., Benato, G., ..., **Guillaumon, P.V.** et al. 2023. Latest observations on the low energy excess in CRESST-III. SciPost Physics Proceedings 12 (013). doi:10.21468/SciPostPhysProc.12.013.

Alfonso, K., Armatol, A., Augier, C., ..., **Guillaumon, P.V.** et al. 2023. A first test of CUPID prototypal light detectors with NTD-Ge sensors in a pulse-tube cryostat. Journal of Instrumentation 18 (06), arXiv: 2304.04674.

Angloher, G., Banik, S., Bartolot, D., ..., **Guillaumon, P.V.** et al. 2023. Results on sub-GeV Dark Matter from a 10 eV Threshold CRESST-III Silicon Detector. Phys.Rev. D 107 (12). arXiv:2212.12513.

Alfonso, K., Armatol, A., Augier, C., ..., **Guillaumon, P.V.** et al. 2022. Twelve-crystal prototype of LiMoO scintillating bolometers for CUPID and CROSS experiments. Journal of Instrumentation 18 (06). arXiv: 2304.04611 (2023).

Angloher, G., Banik, S., Benato, G., ..., **Guillaumon, P.V.** et al. 2023. Observation of a low energy nuclear recoil peak in the neutron calibration data of the CRESST-III Experiment. arXiv:2303.15315.

- Beeman, J.W., Benato, G., Bucci, C., ..., **Guillaumon, P.V.** et al. 2023. Characterization of a kg-scale archaeological lead-based PbWO₄ cryogenic detector for the RES-NOVA experiment. *Applied Radiation and Isotopes* 194, 110704.
- Angloher, G., Banik, S., Bartolot, D., ..., **Guillaumon, P.V.** et al. 2023. Towards an automated data cleaning with deep learning in CRESST. *The European Physical Journal Plus* 138 (1), 1-11.
- Alfonso, K., Armatol, A., Augier, C., ..., **Guillaumon, P.V.** et al. 2022. CUPID: The Next-Generation Neutrinoless Double Beta Decay Experiment. *J Low Temp Phys* (2022).
- Angloher, G., Banik, S., Benato, G., ..., **Guillaumon, P.V.** et al. 2022. Testing spin-dependent dark matter interactions with lithium aluminate targets in CRESST-III. *Phys. Rev. D* 106, 092008.
- Alfonso, K., Armatol, A., Augier, C., ..., **Guillaumon, P.V.** et al. 2022. Optimization of the first CUPID detector module. *The European Physical Journal C* 82 (810).
- Lee, M., Norman, E.B., Akindede, O.A., Thomas K.J., **Guillaumon, P.V.**, Sabella, J.L., Meyer, R.E. and Shugart, H.A. 2022. Fast neutron activation of ubiquitous materials. *Appl Radiat Isot.* 181 (110098)
- Armatol, A., Augier, C., Avignone III, F.T., ..., **Guillaumon, P.V.** et al. 2022. Toward CUPID-1T. *ArXiv:2203.08386*.
- Beeman, J.W., Benato, G., Bucci, C., ..., **Guillaumon, P.V.** et al. 2022. Radiopurity of a kg-scale PbWO₄ cryogenic detector produced from archaeological Pb for the RES-NOVA experiment. *The European Physical Journal C* 82 (692).
- Szabo, T.V., Neto, F.A.B, Moraes, I.C., Oliveira, H.B., **Guillaumon, P.V.**. 2021. FLUKA Simulations of ²²⁵Ac Production Using Electron Accelerators: Validation Through Comparison with Published Experiments. *IPAC2021 - 12th International Particle Accelerator Conference*.
- Guillaumon, P.V.**, Goldman, I.D. 2020. The importance of charged particle reactions in the r-process on supernovae and neutron stars. *ArXiv.2009.01814*.
- Guillaumon, P.V.**, Goldman, I.D., Vanin, V.R., Barcellos de Oliveira, H. 2020. Measurements of $^{nat}Pb(p, xn)^{201-207}Bi$, $^{204}Pb(p, 1-4n)^{201-204}Bi$ and $^{206}Pb(p, 3n)^{204}Bi$ cross-sections at astrophysical energies ($E_p \leq 30MeV$). *ArXiv.2009.02836*.
- Freitas, A.S., Marques, L., Zhang, X. X., Luzio, M.A., **Guillaumon, P.**, Pampa, R., Lichtenthaler, R. 2016. Woods-Saxon Equivalent to a Double Folding Potential. *Braz. J. Phys.* 46, 120–128.
- Smith, A.R., Thomas, K.J., Norman, E.B., Hurley, D.L., Lo, B.T., Chan, Y.D., **Guillaumon, P.V.**, Harvey, B.G., 2014. Measurements of Fission Products from the Fukushima Daiichi Incident in San Francisco Bay Area Air Filters, Automobile Filters, Rainwater, and Food. *Journal of Environmental Protection* 5 (3), 207-221.
- Norman, E.B., Thomas, K., **Guillaumon, P.**, Smith, A.R., 2014. Report on Gamma-Ray Analysis of Seaweed Samples from Naturespirit Herbs LLC. *ArXiv*.
- Serra, A.S., Pascholati, P., Castro, R.M., **Guillaumon, P.V.**. 2009. Survey of the nonlinearities structures in gamma ray energy calibration using HPGe detectors. *International Nuclear Atlantic Conference - INAC 2009*.